



27 May 2003

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sent via email: bpenning@energy.state.ca.us

re: Comments on February draft, Title 24 revision, Equations 143-D and -E

Dear Mr. Pennington:

Comment

These equations are incomplete, in that they do not address variations in emittance in the surface.

More important, they are mathematically incorrect in the treatment of solar reflectance.

They should be corrected.

Rationale

The equations are basically similar in that they calculate the heat gain for reference ("standard") and proposed building configurations. The mathematics are the same.

The energy gain equations do not contain a term dependant on the emittance of the various surfaces. This property can have a significant effect on the true energy balance at the surface, since as emittance changes the surface will shed different amounts of incoming heat during the day and radiate additional heat losses at night.

Secondly, the final part of the equations which deal with the radiative input from the sun contain the expression:

$$[1-(0.2+0.7(\rho - 0.2))]$$

This is simply incorrect.

This is most easily demonstrated by looking at the two limiting cases of perfect solar reflectance ($\rho = 1.00$) and perfect solar absorption ($\rho = 0$). The expression should reduce to 0.0 in the first instance (perfect reflectance = no solar input) and 1.0 in the second (perfect absorption = full solar input).

Instead, the expression equals 0.24 in the first case (very far from zero) and 0.94 in the second case (close to 1.0, but still in error).

If you have any questions, please call me at (323) 908-5279.

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